

RIVERS AND FLOODS.

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At the close of the year 1923, the Ohio River and its southern tributaries were rising rapidly. There was a slight fall in the Monongahela River on the morning of January 2, 1924, and in the Ohio River above Wheeling, W. Va., on the following morning. However, the heavy and general rains of January 2 and 3 checked the fall abruptly, and on January 4 a general rise was again in progress, although at a very slow rate below Louisville, Ky., as the river had receded but little from the comparatively high stages of the preceding month, and had again passed the flood stage from Evansville to Mount Vernon, Ind., on January 2 and 3. Warnings for all the floods were issued regularly, beginning with January 3.

In the Pittsburgh district the crest stages on January 4 ranged from 2 to a little more than 5 feet above the flood stages, except in the vicinity of Wheeling, W. Va., where the crest was only 0.4 foot above the flood stage of 36 feet.

At Pittsburgh the crest stage on January 4 was 27.4 feet, 5.4 feet above the flood stage. The stage of 29 feet that had been forecast would have been reached and higher stages would have occurred below had not the cold wave of January 4 and 5 checked the rise. While some inconvenience resulted and some expense was occasioned through the removal of portable property that was subject to injury from overflow, no damage of consequence occurred.

In the Parkersburg, W. Va., district the crest stages were but little above the flood stage, except at Point Pleasant, W. Va., at the mouth of the Great Kanawha River, where the stage was 5.9 feet above the flood stage of 40 feet. There were no reports of damage or loss.

The flood was also moderate in the Cincinnati, Ohio, district, and there were no losses except about \$10,000 due to moving of portable property and suspension of business. The value of property saved by the warnings was about \$50,000.

Below the mouth of the Kentucky River the floods were rather more severe owing to the greater increments from the Kentucky, Salt, and Green Rivers, and a moderate flood in the Cumberland River. As will be seen in the table, these rivers were well above the flood stage at all points on January 4, and only the cold wave prevented still higher stages. The crest stages at Ohio River stations in the Louisville district occurred between January 9 and 14, and ranged from 2.9 to 9.5 feet above the flood stage, the highest relative stages occurring at the lower gage at Louisville and at Cloverport, Ky. The Kentucky River flood delayed the crest at Louisville somewhat, and the severe flood in Salt River contributed to the flattening of the flood plane between Louisville and Cloverport.

Losses in the Louisville district were small, about \$5,600 only having been reported. Much property in cities, and hay, corn, and fodder in farming districts were removed to places of safety, and the value of property saved through the warnings was reported at \$90,000. The usual inconvenience from flooded roads, etc., was reported. It is noted that the dissemination of warnings was greatly facilitated through the radiophone service of the Louisville Courier Journal and the Louisville Times.

In the Evansville, Ind., district and that portion of the Cairo, Ill., district above the mouth of the Cumberland River the crests were from 7.5 to 9 feet or more above

the flood stages, Shawneetown, Ill., reporting a stage of 44.2 feet on January 27, 9.2 feet above flood stage. No flood stages were reported below Shawneetown, but the stages at Paducah, Ky., and Cairo, Ill., were 42.7 and 43.7 feet, respectively, or 0.3 foot and 1.3 feet below flood stage.

Notwithstanding the high stages of the river, the reported losses were very small, only about \$2,000 in corn left in the fields. No statement can be made of property saved through the warnings, which were frequent, timely, and accurate. However, it was estimated that the value of property saved was several hundred thousands of dollars, largely in livestock and other property removed from the low bottoms.

The floods in the Cumberland and Tennessee Rivers were moderate and were well forecast, and the damage reported was inconsiderable, only \$2,370. The value of property saved through the warnings was given as \$4,700 in the Cumberland Valley. No figures are available for the upper Tennessee River, but great quantities of ties, lumber, cotton, and merchandise at landings were removed to higher ground upon receipt of the warnings.

The losses along the lower Tennessee River and the Ohio River from Shawneetown southward were about \$6,000, while the value of property saved was given as \$61,000, which included the Mississippi River from Cairo, Ill., to New Madrid, Mo.

Floods were also quite general, as a rule, in the northern tributaries of the Ohio River, but all were moderate. However, except in the Hocking River of Ohio, they occurred immediately following the substantial rains of January 10, when the rivers were still comparatively high from the previous rise. The flood conditions also extended over the drainage areas of the Wabash and Green Rivers. Warnings were issued at the proper time, and there were no losses of consequence.

The crest of the flood passed into the Mississippi River on January 14, reaching Memphis, Tenn., on January 18, Vicksburg, Miss., on January 27, and New Orleans, La., on January 31. Flood stage was not reached, except at New Madrid, Mo., where there was a crest of 34.2 feet on January 15-17, 0.2 foot above flood stage.

The heavy rains of January 16 and 17 over the South Atlantic States were followed by moderate floods in many of the rivers. They were forecast at the proper time and accurately, except in one or two instances in which the manipulation of the water for power purposes interfered with the natural flow. No damage of consequence occurred, and a large quantity of livestock, etc., was removed from lowlands upon receipt of the warnings. Along the James River of Virginia, property to the value of \$11,000 was saved.

An average rainfall of at least 3 inches over the drainage area of the Tombigbee River of Alabama and Mississippi from January 1 to 3, inclusive, brought the Tombigbee and Black Warrior Rivers to flood stage within two days. At Tuscaloosa, Ala., on the Black Warrior River the crest stage was 52.7 feet at 8 p. m., January 4, or 6.7 feet above flood stage, while at Demopolis, Ala., on the main stream, the crest was 50.8 feet on January 18, or 11.8 feet above flood stage. The river at Demopolis remained above the flood stage from January 4 to 29, inclusive, but only from January 4 to 6, inclusive, at Tuscaloosa. Warnings were first issued on January 3. A limited area of land was overflowed, but the losses were apparently very small. Property to the value of \$15,000 was reported as having been saved through the warnings.

One statement read: "I have 200 cows; there were thousands of cows in the lowlands here, and owing to your service but few were lost."

The same general rain conditions covered the Pearl and West Pearl River districts of Mississippi and southeastern Louisiana, and there were moderate floods in the Pearl River. The West Pearl River had been in flood at the beginning of the month and continued so at its close. Logging operations were suspended, but there was no damage of consequence as virtually all the crops in the fields had been destroyed by the cold wave of January 6 and 7.

At different times during the month there were moderate local floods in the Sulphur, Cypress, Sabine, and Trinity Rivers of Texas. Warnings were issued when necessary, and no material damage was done.

The flood in the upper Gila River of Arizona subsided after January 5, the crest stage at Kelvin, Ariz., having been 6.4 feet on December 29, 1923, or 1.4 feet above flood stage.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
ATLANTIC DRAINAGE.					
Unadilla:	<i>Feet.</i>			<i>Feet.</i>	
New Berlin, N. Y.....	8	12	12	9.5	12
Chenango:					
Sherburne, N. Y.....	8	12	12	8.2	12
James:					
Columbia, Va.....	18	17	18	23.5	17
Richmond, Va.....	10	18	19	11.8	18
Roanoke:					
Randolph, Va.....	21	18	18	22.6	18
Weldon, N. C.....	30	18	20	37.3	19
Dan:					
Danville, Va.....	8	17	17	8.9	17
Cape Fear:					
Elizabethtown, N. C.....	22	19	19	22.8	19
Peedee:					
Cheraw, S. C.....	27	18	19	29.8	19
Mars Bluff, S. C.....	17	20	25	18.0	20
Santee:					
Rimini, S. C.....	12	18	(1)	15.9	22
Ferguson, S. C.....	12	19	(1)	13.8	22
Catawba:					
Catawba, S. C.....	12	18	18	14.0	18
Congaree:					
Columbia, S. C.....	15	18	18	15.6	18
Broad:					
Blairs, S. C.....	15	17	18	18.4	18
Saluda:					
Chappells, S. C.....	14	17	19	15.0	18
Oconee:					
Milledgeville, Ga.....	22	25	25	23.7	25
EAST GULF DRAINAGE.					
Tombigbee:					
Aberdeen, Miss.....	33	6	7	33.2	6
Lock 4, Demopolis, Ala.....	39	4	29	50.8	18
Black Warrior:					
Lock 10, Tuscaloosa.....	46	4	6	52.7	4
WEST GULF DRAINAGE.					
Pearl:					
Jackson, Miss.....	20	3	31	26.6	17
Columbia, Miss.....	18	17	22	18.8	19-22
West Pearl:					
Pearl River, La.....	13	(1)	(1)	15.7	20
GREAT LAKES DRAINAGE.					
Sandusky:					
Upper Sandusky, Ohio.....	13	12	12	13.3	12
MISSISSIPPI DRAINAGE.					
Monongahela:					
Lock 15, Houlit, W. Va.....	22	4	4	24.5	4
Lock 7, Martin, Pa.....	30	3	4	32.7	3
Lock 4, Pa.....	31	4	4	36.4	4
Youghiogheny:					
Confluence, Pa.....	10	3	3	10.0	3
Ohio:					
Pittsburgh, Pa.....	22	4	4	27.4	4
Lock 2, Coraopolis, Pa.....	26	4	4	26.0	4
Dam No. 6, Beaver, Pa.....	30	4	4	35.0	4
Marietta, Ohio.....	33	4	6	34.9	5

¹ Continued at end of month.

² Continued from last month.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
MISSISSIPPI DRAINAGE—continued.					
Ohio—Continued.	<i>Feet.</i>			<i>Feet.</i>	
Parkersburg, W. Va.....	36	4	6	37.0	5
Point Pleasant, W. Va.....	40	3	7	45.9	5
Dam 28, Near Huntington, W. Va.....	50	5	5	50.4	5
Dam No. 29, Normal, Ky.....	50	4	7	54.7	5
Dam 30, Greenup, Ky.....	52	4	7	53.9	5
Portsmouth, Ohio.....	50	4	7	54.4	5
Maysville, Ky.....	50	4	7	53.5	7
Dam 35, Oneonta, Ky.....	45	4	8	49.2	6
Cincinnati, Ohio.....	52	4	8	55.8	6
Dam 39, Florence, Ind.....	45	5	8	47.4	8
Madison, Ind.....	46	5	9	48.9	7
Louisville, Ky. (upper gage).....	28	5	10	32.9	8
Louisville, Ky. (lower gage).....	53	4	12	62.5	8
Cloverport, Ky.....	40	5	14	47.1	8
Evansville, Ind.....	35	2	26	43.5	10-11
Henderson, Ky.....	33	3	26	41.5	11-12
Dam 48, Cypress, Ind.....	42	3	26	50.4	11-12
Mount Vernon, Ind.....	35	2	36	42.7	12
Shawneetown, Ill.....	35	(*)	27	44.2	14
Shenango:					
Sharon, Pa.....	9	12	13	11.1	12
Tuscarawas:					
Guadenhutton, Ohio.....	10	17	19	13.1	18
Coshocton, Ohio.....	8	12	14	11.0	12
Walhonding:					
Walhonding, Ohio.....	8	11	12	13.0	11
Scioto:					
Larue, Ohio.....	11	11	12	13.2	11
Circleville, Ohio.....	10	12	13	13.8	13
Chillicothe, Ohio.....	16	13	13	17.2	13
Licking:					
Farmers, Ky.....	25	3	4	26.2	3
Kentucky:					
Beattyville, Ky.....	30	4	4	31.4	4
High Bridge, Ky.....	30	4	5	34.6	4
Frankfort, Ky.....	31	4	6	36.3	4
Green:					
Lock 6, Brownsville, Ky.....	30	4	8	35.7	6
Lock 4, Woodbury, Ky.....	33	3	10	44.2	7
Lock 2, Rumsey, Ky.....	31	4	23	40.6	12-13
Wubash:					
Lafayette, Ind.....	11	12	13	12.0	13
Mount Carmel, Ill.....	16	(*)	3	20.0	31
White (East Fork):					
Seymour, Ind.....	10	11	11	10.0	11
White (West Fork):					
Edwardsport, Ind.....	14	12	17	16.8	14
Cumberland:					
Burnside, Ky.....	50	3	4	51.2	3
Celina, Tenn.....	45	5	7	46.4	6
Carthage, Tenn.....	40	4	8	45.1	5
Nashville, Tenn.....	40	4	11	41.0	8
Clarksville, Tenn.....	46	5	13	48.4	12
Lock F, Eddyville, Ky.....	57	10	15	58.9	13
Tennessee:					
Riverton, Ala.....	33	4	8	35.7	6
French Broad:					
Penrose, N. C.....	13	11	12	14.2	11
Asheville, N. C.....	4	16	17	4.3	16
Big Pigeon:					
Newport, Tenn.....	6	11	11	6.5	11
Holston (North Fork):					
Mendota, Va.....	8	1	1	9.3	1
Mississippi:					
New Madrid, Mo.....	34	14	18	34.2	15-17
St. Francis:					
Marked Tree, Ark.....	17	(*)	5	17.4	1-3
Cache:					
Patterson, Ark.....	9	(*)	2	10.5	{Dec. 23-25
Yazoo:					
Yazoo City, Miss.....	25	24	(1)	25.8	31
Tallahatchie:					
Swan Lake, Miss.....	25	7	(1)	28.4	18-20
Red:					
Alexandria, La.....	36	(*)	5	36.9	{Dec. 31 -Jan. 3
Sulphur:					
Ringo Crossing, Tex.....	20	25	26	22.0	25
Finley, Tex.....	24	30	(1)	24.4	31
Cypress:					
Jefferson, Tex.....	18	(*)	2	18.5	{Dec. 31 -Jan. 1
WEST GULF DRAINAGE.					
Sabine:					
Logansport, La.....	25	(*)	4	28.2	{Dec. 26-27
Trinity:					
Liberty, Tex.....	25	(*)	10	25.5	29
COLORADO DRAINAGE.					
Gila:					
Kelvin, Ariz.....	5	(*)	5	6.4	Dec. 29

¹ Continued at end of month.

² Continued from last month.

³ Ice gorge.